

CLAIMS

1. A nozzle arrangement adapted to be fitted to an outlet of a fluid supply and generate a spray of fluid dispensed from said fluid supply during use, said nozzle arrangement having a body which comprises:

- 5           (1) actuator means which is adapted, upon operation, to cause fluid to flow from said fluid supply and through said nozzle arrangements;
- (2) an inlet through which fluid from said fluid supply accesses the nozzle arrangement during use;
- 10           (3) one or more outlet orifices through which fluid is ejected from the nozzle arrangement during use; and
- (4) an internal fluid flow passageway which connects said inlet to said one or more outlet orifices;

              wherein said fluid flow passageway further comprises an internal chamber, said  
15 chamber having two or more inlet orifices, and an outlet orifice through which fluid may exit the chamber wherein each inlet channel and orifice has a big enough diameter to ensure that it will not become partially or totally blocked, and is larger than 0.1mm diameter.

2. A nozzle arrangement according to claim 1, wherein the said internal  
20 chamber has two or more such inlet orifices which are not directed towards the outlet orifice.

3. A nozzle arrangement according to claim 2 wherein the fluid accessing the chamber through said orifices is directed along mutually divergent paths.

4. A nozzle arrangement according to claim 2 wherein the fluid accessing  
25 the chamber through said orifices is directed along mutually convergent paths.

5. A nozzle arrangement according to any preceding claim wherein the fluid accessing the chamber through said orifice or orifices is directed towards an internal wall of the chamber.
6. A nozzle arrangement according to claims 3 or 4 wherein the orifices into said chamber are outlets from ducts or passages aligned in the directions of said paths.
7. A nozzle arrangement according to claim 6, wherein said ducts or passages lead from a space or chamber downstream of said chamber to the orifices in said chamber.
8. A nozzle arrangement according to any preceding claim wherein said chamber has outlet means comprising a plurality of ducts or passages leading to a plurality of outlet orifices.
9. A nozzle arrangement according to any one of claims 1 to 7 wherein said chamber has outlet means comprising an outlet orifice of the nozzle.
10. A nozzle arrangement according to claim 9 wherein a swirl chamber is connected between said chamber and said outlet orifice.
11. A nozzle arrangement according to claim 7 wherein a by-pass passage leads from said downstream space or chamber to said internal chamber.
12. A nozzle arrangement according to claim 11 wherein said by-pass passage feeds a plurality of inlet orifices into said internal chamber.
13. A nozzle arrangement according to claim 12 wherein said plurality of inlet orifices provide a tangential feed into said internal chamber.
14. A nozzle arrangement according to claims 12 or 13 wherein the inlet orifices direct fluid to intersect the flow paths from the first mentioned orifices.

15. A nozzle arrangement according to any preceding claim wherein a first feed for liquor is provided through said inlet orifices, and a second feed for a gaseous medium is provided direct to said internal chamber.
16. A nozzle arrangement according to claim 15 wherein the gaseous medium is introduced into said internal chamber via a plurality of orifices as a tangential or a perpendicular stream.
17. A nozzle arrangement according to claim 16 wherein the streams of gaseous medium entering the internal chamber are directed to intersect the paths of fluid entering the internal chamber through the inlet orifices.
- 10 18. A nozzle arrangement according to claim 15 wherein liquor is fed tangentially to the downstream space, and gaseous medium is fed direct to the downstream space where they are mixed.
- 15 19. A nozzle arrangement according to claim 1, wherein the internal chamber comprises an expansion chamber and has two or more inlet orifices and one or more outlet orifices, said inlet orifices being arranged in a divergent relationship to one another so that the fluid passing through the internal passageway accesses the chamber through said inlet orifice or orifices along independent and divergent paths.
- 20 20. A nozzle arrangement according to claim 19 wherein divergent inlet orifices direct fluid towards the internal walls and/or corners of the chamber.
21. A nozzle arrangement according to claim 20, wherein the fluid entering the chamber is directed towards an opposing wall of the expansion chamber, or a corner between an opposing wall and an adjacent wall of the expansion chamber.

22. A nozzle arrangement according to claim 20 wherein one or more posts or protrusions are positioned within the chamber to provide internal wall surfaces towards which the fluid may be directed.
23. A nozzle arrangement according to any one of claims 19 to 22 wherein  
5 the fluid is directed towards one or more nodules formed on the internal walls and/or corners of the chamber, said nodules being configured to cause further agitation or disturbance to the fluid stream within the chamber.
24. A nozzle arrangement according to any preceding claims wherein the  
10 outlet orifices direct fluid exiting the chamber into a continuation of the passageway.
25. A nozzle arrangement according to any one of claims 19 to 23 wherein the chamber is disposed next to the outlet and the outlet orifices of the expansion chambers also constitute outlet orifices of the nozzle arrangement.
26. A nozzle arrangement according to claim 1 wherein the internal chamber  
15 has two or more inlet orifices disposed in a convergent relationship to one another so that the fluid stream flowing through the inlet orifices into the chamber are directed toward one another and mix within the chamber.
27. A nozzle arrangement according to any preceding claim wherein one or more of said internal chambers is configured to have a width extending  
20 transversely of the flow passage and in the plane of the abutment surface of the two parts of the nozzle arrangement, and a depth perpendicular to said plane which is greater than said width.
28. A nozzle arrangement according to claim 27, wherein said internal chamber has curved interior surfaces defining an elliptical cross-section to said  
25 chamber the major axis of which constitutes the depth.

29. A nozzle arrangement according to claim 27 wherein said internal chamber has plane interior surfaces defining a rectangular or other polygonal cross-section to said chamber.

30. A nozzle arrangement according to claim 27 wherein two or more of  
5 said chambers extend in parallel and are provided in independent multiple flow paths of said flow passage.